Assessing Ventilator-Associated Pneumonia (VAP) in the PICU Using Deep Learning

Members: Suraj Shah
Mentors: Drs. Mathias Unberath, Jules Bergmann, and Jim Fackler

Motivation:

• Chest X-Rays are the empirical standard in pneumonia diagnosis, yet subject to radiologist interpretation and conclusions
• Mechanical ventilation is a critical ICU therapy; 20% of ICU patients are diagnosed with VAP

Goal:

• Prepare automatic classifier to be used in ICU/PICU settings to diagnose VAP

Methods:

• Transfer Learning using pre-trained CNNs
• Class Activation Maps based on trained model

Results:

• Achieved 94%+ accuracy in diagnosing pneumonia
• Provided physicians with accurate image localization
Appending Information

Ingestion and Training Pipeline

Training Environment:
- Utilized GPU nodes from MARCC
- MIMICS: 350K+ images
- NIH: 115K+ images
- Trained on 65K image subsets from both databases, with cross-validation on both (10K image validation set)